

APPENDIX B

HALIBUT PROHIBITED SPECIES CATCH LIMITS

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This chapter presents information on halibut bycatch in the groundfish fisheries conducted in the Gulf of Alaska (GOA). It is intended for use by the Council to determine the halibut bycatch framework measures. Domestic groundfish fisheries for halibut, sablefish, pollock, flounder, rockfish, and Pacific cod are all currently managed by species or complex, and yet most species are caught together to some extent. This is true for all gear types. Under the current management scheme, fisheries directed at one species often discard other species, resulting in some discard mortality. Discard mortality of several species may be significant. The incidental catch and mortality of halibut in bottom trawl and longline groundfish fisheries are of principal concern in the Gulf.

Bycatch has in the past been controlled by reducing the total allowable catch (TAC) of other target species through the use of Prohibited Species Catch (PSC) limits, season delays, or some combination of these measures. Since 1995, an Individual Fishing Quota (IFQ) program has been in place in Gulf of Alaska, Bering Sea, and Aleutian Islands which allows the concurrent landing of both species with appropriate quota share holdings. Halibut discard mortality was reduced by 450 mt when the sablefish IFQ fishery was exempted from setting halibut PSC limits in 1995.

The Framework Process

Regulations require the Secretary of Commerce, after consultation with the Council, to propose the PSC limits as soon as practical after October 1 for the next fishing year. Thus, when the Council meets during October, it must decide what recommendations it will provide to the Secretary.

The Council can make recommendations for PSC mortality limits as follows:

1. Among trawl, hook-and-line, and pot gear.
2. Among fisheries complexes (i.e., shallow water trawl and deep water trawl complexes).
3. By season, which may be quarterly, semiannually, or any other reasonably configured period.
4. Gulf-wide or between the Western and Central Regulatory Areas and among the Districts of the Eastern Regulatory Area.

The Secretary will propose the PSC mortality limits in the *Federal Register* and request comment for 30 days from the date of filing with the Office of the Federal Register. The Council will review comments and will make final recommendations on PSC mortality limits at its December meeting. The Secretary will publish final PSC mortality limits again in the *Federal Register* to be used to manage halibut bycatch mortality in the bottom trawl, hook-and-line, and/or pot fisheries in the Gulf of Alaska during that following fishing year.

The Council is not constrained to any particular PSC limit. The International Pacific Halibut Commission (IPHC) has recommended that halibut bycatch mortality not exceed 6,000 mt in the North Pacific, and has further recommended that halibut bycatch mortality in the Bering Sea/Aleutian Islands and GOA be limited to 4,000 mt and 2,000 mt, respectively. In 1996, the IPHC requested that the Council further decrease PSC caps by 10 percent in 1998, further reduce bycatch in 1999, and divide the savings between lower halibut bycatch limits and increased groundfish harvest.

During each year between 1986-89, the Council recommended a 2,000 mt bycatch mortality limit in the GOA, with only the bottom trawl fishery being affected if this limit had been reached. Between 1990-94, the Council has recommended an additional bycatch mortality limit of 750 mt for fixed gear fisheries. Since 1995, the Council reduced the PSC cap for hook-and-line gear to 300 mt by exempting the IFQ sablefish fishery from halibut PSC restrictions. Pot gear was exempted from closures under the fixed gear cap, so all of the 750 mt was allocated to hook-and-line gear.

Establishing PSC limits for the Gulf of Alaska

Bycatch mortality of Pacific halibut in the Gulf of Alaska groundfish fisheries (trawl and hook & line) is shown below for the last twenty years (in mt, based on IPHC and NMFS estimates). The amounts of halibut bycatch mortality shown for 1980-1986 reflect estimates of halibut bycatch and mortality from primarily foreign and joint-venture fisheries. The fishing practices currently in use by the fully domesticated fishery may produce very different bycatch estimates. Therefore, data gathered under the domestic observer program beginning in 1990 probably present a more realistic picture of the current groundfish fishery in the Gulf of Alaska. The Plan Team feels that this is the best information available upon which to base decisions regarding the setting of PSC limits for halibut in the Gulf of Alaska.

Halibut Bycatch Management in the Gulf of Alaska

Definition of terms:

- Bycatch rate - kg/mt of halibut caught in total groundfish catch.
- Mortality rate - that % of halibut bycatch that die after being caught.
- Bycatch mortality rate - kg/mt of halibut that are killed in total groundfish catch.

The NMFS Alaska Region manages the groundfish fisheries using halibut bycatch rates from the NMFS Alaska Fishery Science Center's Observer Program Office. The Alaska Region also used assumed mortality rates, which were recommended by the IPHC and reviewed by the Council. These mortality rates were based on a study of release condition factors. The 2002 fishery-specific discard mortality rates used were as follows:

<u>Year</u>	<u>Bycatch (mt)</u>
1980	4,596
1981	4,096
1982	3,785
1983	3,134
1984	2,382
1985	1,134
1986	935
1987	2,061
1988	2,243
1989	2,646
1990	3,936
1991	3,700
1992	3,383
1993	3,244
1994	2,973
1995	2,449
1996	2,118
1997	2,228
1998	2,319
1999	2,526
2000	2,128
2001	2,485
2002*	2,172
*as of November 2, 2002	

NOTE: kg/mt can be converted to % by moving the decimal place to the left one place; for example 21.3 kg/mt is equivalent to 2.13% bycatch per groundfish catch, such that: Bycatch rate X mortality rate = bycatch mortality rate (which can be expressed as either kg/mt or as a percent).

GOA Trawl fisheries:

Atka mackerel	70%
Bottom trawl pollock	61
Pacific cod	61
Deepwater flatfish	60
Shallow water flatfish	69
Rockfish	69
Flathead Sole	58
Other species	14
Pelagic pollock	72
Sablefish	66
Arrowtooth flounder	62
Rex Sole	61

GOA Hook and Line fisheries:

(under mandatory Careful Release Measures)	
Pacific cod	14
Rockfish	8
Sablefish	24
Other Species	14

GOA Pot fisheries:

Pacific cod	14
Other Species	14

Seasonal Apportionments of the Halibut PSC Limit

Under Amendment 21, the halibut PSC limits can be seasonally apportioned. These limits were apportioned quarterly to trawl and hook-and-line gear beginning in 1991. Hook-and-line apportionments were changed to trimesters under Amendment 45 beginning in 1996. Halibut are expected to be in shallow water during summer months (June through September), and fisheries for Pacific cod and shallow water flatfish require larger shares of the PSC mortality limit during this time to preclude a premature fishery closure. Fisheries for sablefish and deepwater flatfish require larger shares of the PSC mortality limit during January through May and during October through December for similar reasons. Since 1995, the sablefish IFQ hook-and-line fishery has been conducted from March 15 to November 15, coincident with the halibut IFQ fishery

Since 1995, total halibut PSC limits for all fisheries and gear types has totaled 2,300 mt. This cap was reduced from 2,750 mt after the sablefish IFQ fishery was exempted from the halibut PSC requirements in 1995. The following 2002 halibut PSC apportionments were instituted for the Gulf of Alaska groundfish fisheries:

2002 Trawl		2002 Hook and Line		
Jan 1 - Apr 1	550 mt	1st trimester	Jan 1 - Jun 10	250 mt
Apr 1 - Jul 10	400 mt	2nd trimester	Jun 10 - Sept 1	5 mt
Jul 1 - Sept 1	600 mt	3rd trimester	Sept 1 - Dec 31	35 mt
Sept 1 - Oct 1	150 mt			
Oct 1 - Dec 31	300 mt	DSR	Jan 1 - Dec 31	10 mt
TOTAL				300 mt
	2,000 mt			

One of the Council's objectives is to promote harvest of as much of the groundfish optimum yield (OY) as possible with a given amount of halibut PSC. If some gear types have excessively high bycatch rates during a given season, the Council may consider withholding halibut PSC in order to promote other gear types, which otherwise might be closed prematurely, thereby promoting harvest of the OY.

A regulatory amendment implemented in 1994 set up shallow water and deep water fishery complex categories. The shallow water complex includes pollock, Pacific cod, Atka mackerel, shallow water flatfish, flathead sole, and other species. The closures do not apply to fishing for pollock by vessels using pelagic trawl gear in those portions of the GOA open to directed fishing for pollock. The deep water complex includes deep water flatfish, rex sole, arrowtooth flounder, sablefish, and rockfish. The bycatch trawl limit for the first three quarters was

subdivided between shallow water and deep water complexes. The remaining 300 mt trawl limit is not apportioned.

Seasonal Halibut Bycatch Mortality Caps

Since 1993, halibut PSC mortality has applied only to the bottom trawl and hook-and-line fisheries. The midwater trawl fishery (targeting on pollock) has been exempt from bycatch-related closures. The pot fishery (primarily for Pacific cod), was exempted from fixed gear PSC limit due to minimal bycatch mortality. Descriptions of halibut bycatch management in the 2002 trawl and hook-and-line fisheries follow.

Season	Trawl fishery categories		Total
	Shallow Water	Deep Water	
Jan 1- Apr1	450 mt	100 mt	550 mt
Apr 1- Jun 30	100 mt	300 mt	400 mt
Jun 30-Sep 1	200 mt	400 mt	600 mt
Sep 1 - Oct 1	150 mt	any rollover	150 mt
Oct 1-Dec 31	no apportionment		300 mt
TOTAL	900 mt	800 mt	2,000 mt

The Gulf of Alaska Trawl Fisheries

Trawl gear was used to harvest pollock, flatfish, rockfish, Pacific cod, sablefish, and arrowtooth flounder. The 2002 mt PSC halibut bycatch mortality limit has been unchanged since 1989, and has been apportioned quarterly such that 28%, 22%, 35%, and 15% are apportioned during the first, second, third, and fourth quarters, respectively.

Trawling for the deep-water fishery complex were closed in each quarter on May 24, August 2, and October 13 to prevent exceeding the halibut bycatch limit. The shallow-water fishery was closed in each quarter on May 15, August 5, and October 13. All trawling in the GOA closed (with the exception of pelagic trawl gear targeting pollock) on October 13.

Through November 2, 2002 total halibut bycatch mortality from trawl gear was 1,956 mt (Table 1). A summary of trawl halibut bycatch in the Gulf of Alaska for shallow water and deep water complexes by target fishery and week is shown in Table 2.

The Gulf of Alaska Hook-and-Line Fisheries

The hook-and-line fisheries are directed primarily at sablefish and Pacific cod, with minor effort on rockfish. The PSC halibut mortality limit of 300 mt for the hook-and-line fisheries was apportioned seasonally by trimester. The 300 mt allocation included 10 mt for the demersal shelf rockfish fishery in Southeast Alaska. For the first trimester, 250 mt was allocated. For the second trimester, 5 mt was allocated. The remaining 35 mt was allocated to the rest of the fishing year. The sablefish hook-and-line fishery is managed as an IFQ fishery. The season runs from March 15 to November 15, simultaneous with the halibut IFQ fishery.

Through November 2, 2002, total halibut bycatch mortality from hook-and-line gear was 227 mt. The breakdown of hook and line halibut bycatch rates by target fishery and week is provided in Table 3.

The Gulf of Alaska Pot Fishery

Pot gear was used to harvest mostly Pacific cod. Total mortality attributed to pot gear was approximately 2 mt in 2002, 4 mt in 2001, and 7 mt in 2000 (Table 4). Pot gear has been exempted from PSC mortality limits since 1993.

Expected Changes in Groundfish and Halibut Stocks

Given the preceding review of the bycatch situation in the Gulf for 1999, it may be useful to examine possible changes in the levels of biomass for target groundfish species and Pacific halibut. Some changes in the expected catch of groundfish for the upcoming fishing year will follow from the biomass estimates reported elsewhere in this SAFE report for GOA groundfish species as a result of the TACs established by the Council. Groundfish catch for most species will equal the TACs, tempered only by the PSC limits imposed by the Council. Lack of interest by industry in harvesting low value species, such as flatfish, may moderate this assumption to some degree. In general, it is apparent that changes in groundfish catch can have no effect on halibut bycatch once a PSC is established; rather, the PSC drives the formula and dictates the catch of groundfish. The Team recommended an ABC of 414,820 mt for 2003. The 2002 ABC was 394,780 mt. The catch in the GOA fisheries was only 162,207 mt (as of November 2, 2002) of the total 2002 TAC of 237,890 mt (68%) due to PSC limitations and lack of interest in low value species.

In 1997, the IPHC revised its stock assessment methodology for setting annual catch limits for Pacific halibut. As a result, catch limits for the GOA has increased from 19,730 mt in 1995, peaked at 29,270 mt in 1999, and dropped to 28,540 mt in 2001. The higher catch limits reflect healthier stock conditions. IPHC staff report no significant change to the Pacific halibut stock assessment or quotas for 2003. Catch limits for 2003 will be decided in late January 2003.

Potential methods for bycatch reduction

With the implementation of an individual fishing quota system for halibut and sablefish longline fisheries in 1995, bycatch and waste were reduced because the race for fish was eliminated, allowing for more selective fishing practices and significant reductions in actual gear deployment/loss. As a result of the IFQ halibut and sablefish program, the halibut bycatch limit for non-trawl fisheries was reduced by 450 mt in Gulf of Alaska.

Since 1991, NMFS has implemented numerous management measures that reduce halibut bycatch in the groundfish fleet. The Council is developing a vessel bycatch allowance program, but further development has been stalled by the press of other Council business. In the interim, management options such as bycatch incentive programs, timing of groundfish seasons, and seasonal apportionments of the halibut PSC limits probably represent the most realistic methods of reducing halibut bycatch. In addition to bycatch limits, gear restrictions and other regulatory changes have also been implemented to reduce bycatch and waste. Biodegradable panels are required for pot gear to minimize waste associated with so-called ghost fishing of lost gear. Tunnel openings for pot gear are limited in size to reduce incidental catch of halibut and crabs. Gillnets for groundfish have been prohibited to prevent ghost fishing and reduce bycatch of non-target species.

Several possible methods exist which could contribute to a reduction in halibut bycatch by the groundfish fisheries. One method would be to set the TACs for groundfish at a level which would preclude excessive bycatch. Based on prevailing bycatch rates and mortality rates for each gear group, TACs can be back-calculated and set at levels to attain the desired level of bycatch. The economic tradeoffs associated with this method are discussed in the EA/RIR for Amendment 18. The current halibut bycatch limits amount to approximately 1% of halibut total biomass.

Gear modifications are a potential method of reducing the bycatch rates in the groundfish fisheries. The Council has examined the voluntary use of grid sorting to reduce halibut mortality and is currently reviewing the results of an experimental fishing permit for the use of a halibut excluder device in trawl gear. Any of these options would impose some kind of costs to the fishery which may or may not be offset by the potential benefits of the option chosen.

Gulf of Alaska Trawl Fisheries

<u>Pacific cod</u>	Bycatch rates have been lower from February through mid April compared to rates from late April through early August.
<u>Pollock</u>	Bycatch rates are lowest during the periods when pelagic gear is used.
<u>Flatfish</u>	Bycatch rates have been low in February and high from late March through mid May. However, differences in rate may be due to species composition. Dover sole, rex sole, and flathead sole are considered deep water flatfish species. Others are considered to be shallow water flatfish species.
<u>Rockfish</u>	Bycatch rates have been high from March through mid May and lower from late May through mid August. If trawling for rockfish were directed at slope species, then the lower rates during summer may be the result of halibut moving into shallower water, thereby escaping the deep water rockfish fishery.
<u>Sablefish</u>	Sablefish is limited to bycatch status for trawl gear. NMFS assumes that any catches occurs as a result of incidental catches in other directed groundfish fisheries.
<u>Arrowtooth flounder</u>	This species is considered to be a deep water flatfish species, although they may occur in shallow water, also. Few data exist to indicate a trend. High bycatch rates have occurred from late June through mid August as a result of trawling for arrowtooth in shallow water.

Gulf of Alaska Hook-and-Line Fisheries

<u>Pacific cod</u>	Bycatch rates have been lower from January through mid-April and in the past, have been relatively high from late April through May, likely as a result of halibut moving into shallow water where Pacific cod are found.
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Gulf of Alaska Pot Fishery

<u>Pacific cod</u>	Bycatch rates generally have been low year-round due to regulations limiting the size of tunnel openings.
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Seasonal distribution of halibut and target groundfish

Halibut bycatch rates for trawl, hook-and-line, and pot gear vary seasonally. Much of the information on the seasonal distribution of halibut can be drawn from the commercial fishery and research surveys. These sources indicate that adult halibut undertake a seasonal migration related to a winter spawning period and a summer feeding period. Spawning generally takes place between 230 and 450 m in depth during November through March, but is greatest during December and January. During April and May, the fish can be found moving up through the gullies and onto the offshore banks, typically 135 to 270 m. During the summer months of June through August, halibut are found in shallow waters, up to 45 m or less in some cases, but generally less than 135 m. Halibut are occasionally found in bays feeding on salmon and other fish. In September and October, halibut begin their movement back to deeper water for spawning. Thus, the spring months of April/May and fall months of September/October can be considered transition periods.

Trawl surveys have yielded information on the distribution of juvenile halibut (ages 2 through 4). Fish of this age are distributed throughout the entire Gulf during the year out to a depth of 180 m and occasionally deeper. However, abundance is greatest at depths of 100 meters or less. Little, if any, seasonal migration is observed in halibut of this size.

The seasonal distribution of the major groundfish species in the Gulf should be considered relevant to the distribution of halibut in efforts to minimize halibut bycatch. Walleye pollock, a pelagic species in all life stages, have probably the least interaction with halibut, in terms of physical location, of all the target groundfish species in the Gulf. Seasonal movements do occur with the fish moving to shallower water in the spring and summer. In the fall and winter months they return to deeper water. There may be vertical movement in the water column associated with feeding and diurnal patterns. Typically, they are found throughout the water column from shallow to deep water, frequently forming large schools at depths of 100-400 m along the outer continental shelf and slope.

Pacific cod are a widespread demersal species found along the continental shelf from inshore waters to the upper slope with adults commonly found at depths of 50-200 m. During the winter and spring cod appear to concentrate in the canyons that cut across the shelf and along the shelf edge and upper slope at depths of 100-200 m where they overwinter and spawn. Most spawning occurs in the spring at depths of 150-200 m along the outer continental shelf off Kodiak Island and in the Shelikof Strait area, as well as Prince William Sound. In the summer, they shift to shallower depths, usually less than 100 m.

The flatfish group, which are all demersal but have varying depth ranges, includes arrowtooth flounder, starry flounder, flathead sole, rock sole, Dover sole, yellowfin sole, and rex sole. Arrowtooth flounders are abundant over a depth range of 100-500 m and aggregate in the deeper portion of that range during the winter months. High densities have been indicated by resource surveys in the waters off southeastern Alaska at depths of 200-400 m. Most occurrences of starry flounder in the Gulf have been at depths less than 150 m while flathead sole are typically found at depths less than 250 m. Rock sole are more of a shallow water species and are most abundant in the Kodiak and Shumagin areas at depths of less than 100 m. Dover sole and rex sole are found throughout the northeastern Pacific and Bering Sea at depths usually less than 275 m. Yellowfin sole are a relatively abundant species in Cook Inlet and are also found in Prince William Sound.

The rockfish group includes four assemblages separated on the basis of habitat and behavioral characteristics - slope rockfish, pelagic shelf rockfish, demersal shelf rockfish, and thornyhead rockfish. Little information is available on life history and distribution patterns of demersal and pelagic shelf rockfish.

Little is known of the slope assemblage, except for Pacific ocean perch (POP). POP are found over a wide range of depths, usually between 100 and 450 m, with the adults performing seasonal bathymetric migrations

associated with reproduction and feeding. They apparently migrate into deep water during fall and winter to spawn and then move to shallower depths to feed in the spring and summer. Separate schools of males and females have been observed migrating from feeding grounds at depths of 150-185 m in the Unimak Pass region to spawning areas at depths of 350-400 m in the Yakutat Bay area. Thornyhead rockfish are benthic and seldom venture off the bottom where they occur at depths of 100-1,500 m.

Sablefish occur in the outer shelf, slope, and abyssal habitats over a depth range of 200-1,200 m with the centers of abundance occurring from 400-1,000 m along the continental slope, especially in or near submarine canyons. Sablefish spawn during late winter to early spring along the continental slope at depths exceeding 400 m. Sablefish spend their first year in estuarine areas, after which their depth distribution increases with age and some fish reach depths of 300 m by their third year. Some research evidence points to migratory movements by sablefish during different life stages, while other research indicates that sablefish remain in the same general bottom area where they settle as sub-adults.

Economic effects of groundfish seasons and seasonal halibut PSCs

An alteration of any species/gear type fishing season will impose some types of costs on certain segments of the fishing industry as well as result in benefits to the same or other segments of the industry. A delay in the season opening could impose costs in the form of foregone revenues. For instance, a delay in the season may shift effort, resulting in less of the PSC limit being available to a higher valued fishery.

Seasonal allocations of the PSC limits will likely have the same potential effects on the fishery as outlined above. The setting of the seasonal apportionments of the PSC limits will be directly related to any season changes adopted by the Council. The way in which these PSC limits are seasonally apportioned will affect the character of the fisheries for each major gear group throughout the year. A change in fishing seasons would require a corresponding shift in the PSC apportionments to accommodate the new season. The result is a tradeoff that must consider the relative values of the different groundfish species harvested and the relative values of halibut bycatch to those fisheries. Ideally, the seasonal apportionment of halibut PSC limits will provide the mechanism for each fishery to fully exploit the available resource without exceeding the PSC limits for each gear group. Fishermen and other industry representatives may be in the best position to provide the relevant information upon which to base the decisions regarding the seasonal apportionment of these halibut PSC limits.

Fishing seasons have been modified as a result of management measures required to minimize fishing impacts on endangered Steller sea lions. Further, changes to season start dates will be examined in a proposed plan amendment to revise the annual specification-setting process.

Table 1

NMFS/AKR
11/14/02
14:30:06

2002 GULF OF ALASKA FISHERIES
TRAWL HALIBUT BYCATCH MORTALITY (METRIC TONS)
Week Ending: 11/09/02

WED	SHALLOW WATER COMPLEX		DEEP WATER COMPLEX		GRAND TOTAL
	WEEK TOTAL	CUMULATIVE TOTAL	WEEK TOTAL	CUMULATIVE TOTAL	
01/26/02	2	2	0	0	2
02/02/02	24	26	0	0	26
02/09/02	29	55	6	6	61
02/16/02	20	75	0	6	81
02/23/02	34	109	5	11	120
03/02/02	22	131	5	15	147
03/09/02	61	192	0	15	207
03/16/02	11	204	4	20	223
03/23/02	8	211	4	24	235
03/30/02	6	217	16	39	257
04/06/02	29	246	34	74	320
04/13/02	20	266	70	144	410
04/20/02	29	295	40	183	479
04/27/02	41	337	57	240	577
05/04/02	60	396	45	285	681
05/11/02	123	519	30	315	834
05/18/02	39	558	62	377	935
05/25/02	0	558	17	394	952
06/01/02	0	558	0	394	952
07/06/02	0	558	115	509	1,067
07/13/02	0	558	87	596	1,154
07/20/02	3	561	79	675	1,236
07/27/02	165	726	101	775	1,501
08/03/02	102	828	51	826	1,654
08/10/02	43	871	0	826	1,697
08/31/02	0	871	0	826	1,697
09/07/02	0	871	0	826	1,697
09/14/02	0	871	0	826	1,697
09/21/02	0	871	0	826	1,697
10/05/02	96	968	22	848	1,816
10/12/02	62	1030	51	899	1,929
10/19/02	12	1042	1	901	1,942
10/26/02	2	1044	0	901	1,944
11/02/02	0	1044	0	901	1,945
11/09/02	12	1056	0	901	1,956

CAP: 900
% OF CAP: 117%
REMAINING: - 156

CAP: 800
% OF CAP: 113%
REMAINING: - 101

SEASON	SEASONAL HALIBUT BYCATCH MORTALITY CAPS		TOTAL
	SHALLOW COMPLEX	DEEP COMPLEX	
Jan 01 - Apr 01	450 MT	100 MT	550 MT
Apr 01 - Jun 30	100 MT	300 MT	400 MT
Jun 30 - Sep 01	200 MT	400 MT	600 MT
Sep 01 - Oct 01	150 MT	Any rollover	150 MT
Oct 01 - Dec 31	- No Apportionment -	-	300 MT
TOTALS	900 MT	800 MT	2000 MT

Balance of 4th Quarter available for all trawl fisheries

Shallow Water Complex = pollock, Pacific cod, shallow-water flatfish, flathead sole, Atka mackerel, and "other species."
Deep Water Complex = sablefish, rockfish, rex sole, arrowtooth flounder, and deep-water flatfish.

TABLE 2

2002 Halibut Bycatch by target fishery and week
in the Gulf of Alaska

KEY	Groundfish		Trawl Gear		Halibut Mortality	
	Metric Tons	Metric Tons	Halibut Bycatch Rate (kg/mt)	Metric Tons	%	
B 02/02/02	285.15	0.92	3.23	0.56	0.2	
B 02/09/02	12.92	0.00	0.08	0.00	0.0	
B 03/02/02	65.38	0.43	6.65	0.27	0.4	
B 03/16/02	1,497.42	0.05	0.04	0.02	0.0	
B 03/23/02	494.73	0.02	0.04	0.02	0.0	
B 03/30/02	177.34	0.03	0.16	0.02	0.0	
B 04/06/02	494.72	0.08	0.16	0.05	0.0	
B 08/31/02	1,382.44	0.07	0.05	0.04	0.0	
B 09/07/02	2,092.15	0.10	0.05	0.06	0.0	
B 09/14/02	99.62	0.00	0.03	0.00	0.0	
B 10/05/02	1,287.65	0.57	0.44	0.34	0.0	
B 10/12/02	960.09	0.24	0.25	0.15	0.0	
B 10/19/02	468.79	0.12	0.26	0.08	0.0	
B 10/26/02	526.41	3.50	6.65	2.14	0.4	
B 11/02/02	580.95	0.00	0.00	0.00	0.0	
B 11/09/02	129.26	0.00	0.00	0.00	0.0	
C 01/26/02	139.05	2.77	19.93	1.69	1.2	
C 02/02/02	1,410.18	39.00	27.66	23.80	1.7	
C 02/09/02	2,092.80	47.66	22.77	29.06	1.4	
C 02/16/02	1,479.84	23.76	16.06	14.50	1.0	
C 02/23/02	3,281.76	44.11	13.44	26.91	0.8	
C 03/02/02	2,382.02	36.28	15.23	22.13	0.9	
C 03/09/02	3,726.54	98.75	26.50	60.25	1.6	
C 03/16/02	532.27	15.08	28.34	9.20	1.7	
C 06/01/02	5.51	0.00	0.00	0.00	0.0	
C 09/14/02	0.29	0.00	6.90	0.00	0.0	
C 10/05/02	71.08	7.97	112.18	4.86	6.8	
C 10/12/02	3.76	0.54	144.49	0.33	8.8	
C 11/02/02	93.79	0.65	6.91	0.40	0.4	
D 02/16/02	1.18	0.08	65.88	0.05	4.2	
D 03/30/02	30.37	6.37	209.91	3.82	12.6	
D 04/06/02	222.73	14.67	65.88	8.81	4.0	
D 04/13/02	240.93	15.87	65.88	9.52	4.0	
D 04/27/02	29.22	1.93	65.88	1.16	4.0	
D 05/04/02	17.10	1.13	65.88	0.68	4.0	
D 05/25/02	1.76	0.12	65.88	0.07	4.0	
H 02/23/02	137.98	9.80	71.02	6.76	4.9	
H 03/09/02	30.49	0.72	23.75	0.50	1.6	
H 03/16/02	56.53	3.21	56.74	2.22	3.9	
H 03/23/02	149.29	10.76	72.04	7.42	5.0	
H 03/30/02	148.15	8.57	57.86	5.91	4.0	
H 04/06/02	531.81	34.74	65.33	23.97	4.5	
H 04/13/02	342.93	13.17	38.42	9.09	2.7	
H 04/20/02	392.90	17.34	44.14	11.97	3.0	
H 04/27/02	997.07	57.16	57.33	39.44	4.0	
H 05/04/02	1,110.33	86.26	77.69	59.53	5.4	
H 05/11/02	1,835.89	172.01	93.69	118.69	6.5	
H 05/18/02	537.58	52.89	98.39	36.49	6.8	
H 07/20/02	163.15	4.06	24.87	2.80	1.7	
H 07/27/02	1,948.00	234.64	120.45	161.90	8.3	
H 08/03/02	1,215.36	146.68	120.69	101.22	8.3	
H 08/10/02	806.41	60.82	75.42	41.96	5.2	
H 10/05/02	1,517.77	129.04	85.02	89.04	5.9	
H 10/12/02	1,012.38	88.20	87.12	60.85	6.0	
H 10/19/02	182.06	17.15	94.22	11.84	6.5	

H 11/09/02	178. 87	16. 95	94. 75	11. 70	6. 5
K 03/30/02	7. 31	0. 06	8. 59	0. 04	0. 5
K 04/06/02	14. 22	0. 12	8. 59	0. 08	0. 6
K 05/11/02	63. 65	2. 51	39. 44	1. 73	2. 7
K 05/25/02	6. 16	0. 14	23. 47	0. 10	1. 6
K 07/06/02	9, 733. 55	146. 95	15. 10	101. 41	1. 0
K 07/13/02	6, 713. 92	108. 77	16. 20	75. 04	1. 1
K 07/20/02	4, 042. 46	77. 34	19. 13	53. 37	1. 3
K 07/27/02	203. 77	14. 87	72. 97	10. 26	5. 0
L 02/16/02	109. 50	9. 51	86. 83	5. 51	5. 0
L 03/09/02	47. 40	0. 14	2. 94	0. 08	0. 2
L 03/30/02	41. 91	0. 54	12. 89	0. 31	0. 7
L 04/06/02	233. 17	8. 37	35. 91	4. 86	2. 1
L 04/13/02	608. 15	18. 85	31. 00	10. 94	1. 8
L 04/20/02	1, 029. 97	29. 58	28. 72	17. 16	1. 7
L 04/27/02	110. 66	3. 25	29. 35	1. 88	1. 7
L 05/11/02	76. 99	6. 68	86. 83	3. 88	5. 0
L 05/18/02	55. 75	4. 84	86. 83	2. 81	5. 0
L 07/27/02	63. 70	5. 38	84. 53	3. 12	4. 9
L 08/03/02	38. 77	0. 80	20. 72	0. 46	1. 2
L 08/10/02	142. 35	2. 46	17. 30	1. 43	1. 0
L 10/05/02	46. 55	3. 76	80. 82	2. 18	4. 7
L 10/12/02	57. 20	0. 85	14. 91	0. 49	0. 9
O 03/09/02	0. 26	0. 00	11. 42	0. 00	0. 0
O 03/16/02	0. 12	0. 01	108. 00	0. 01	8. 3
O 07/06/02	3. 72	0. 04	11. 42	0. 03	0. 8
O 07/13/02	1. 42	0. 02	11. 42	0. 01	0. 7
O 07/20/02	1. 13	0. 01	11. 42	0. 01	0. 9
P 01/26/02	2, 843. 45	0. 00	0. 00	0. 00	0. 0
P 02/02/02	665. 68	0. 03	0. 04	0. 01	0. 0
P 02/09/02	164. 66	0. 01	0. 07	0. 01	0. 0
P 02/16/02	237. 07	0. 01	0. 05	0. 01	0. 0
P 02/23/02	232. 99	0. 00	0. 00	0. 00	0. 0
P 03/02/02	381. 89	0. 01	0. 01	0. 00	0. 0
P 03/09/02	228. 03	0. 00	0. 00	0. 00	0. 0
P 03/16/02	3, 725. 33	0. 03	0. 01	0. 01	0. 0
P 03/23/02	6, 648. 78	0. 15	0. 02	0. 11	0. 0
P 03/30/02	5, 215. 28	0. 11	0. 02	0. 08	0. 0
P 04/06/02	632. 37	0. 00	0. 00	0. 00	0. 0
P 08/31/02	7, 544. 14	0. 24	0. 03	0. 17	0. 0
P 09/07/02	3, 754. 57	0. 04	0. 01	0. 02	0. 0
P 09/14/02	1, 831. 56	0. 01	0. 00	0. 00	0. 0
P 09/21/02	178. 70	0. 02	0. 09	0. 01	0. 0
P 10/05/02	5, 827. 01	0. 00	0. 00	0. 00	0. 0
P 10/12/02	1, 127. 36	0. 06	0. 06	0. 05	0. 0
P 10/19/02	227. 75	0. 01	0. 06	0. 01	0. 0
S 07/06/02	156. 65	1. 37	8. 74	0. 90	0. 6
W 04/13/02	721. 38	25. 74	35. 68	15. 96	2. 2
W 04/20/02	96. 04	5. 50	57. 28	3. 41	3. 6
W 05/04/02	285. 00	14. 04	49. 28	8. 71	3. 1
W 05/11/02	45. 91	0. 28	6. 20	0. 18	0. 4
W 05/18/02	1, 314. 65	55. 94	42. 55	34. 69	2. 6
W 05/25/02	344. 98	9. 67	28. 03	5. 99	1. 7
W 07/06/02	480. 10	13. 99	29. 13	8. 67	1. 8
W 07/13/02	483. 35	14. 08	29. 13	8. 73	1. 8
W 07/20/02	1, 342. 31	41. 31	30. 78	25. 61	1. 9
W 07/27/02	3, 052. 77	145. 73	47. 74	90. 35	3. 0
W 08/03/02	2, 484. 03	81. 55	32. 83	50. 55	2. 0
W 10/05/02	881. 64	35. 38	40. 13	21. 94	2. 5
W 10/12/02	1, 668. 20	76. 29	45. 73	47. 30	2. 8

W 10/19/02	148.38	1.55	10.46	0.96	0.6
X 02/09/02	145.32	9.89	68.06	6.03	4.1
X 02/23/02	110.81	7.54	68.06	4.60	4.2
X 03/02/02	111.68	7.60	68.06	4.64	4.2
X 03/16/02	337.41	7.12	21.10	4.34	1.3
X 03/23/02	264.13	6.54	24.75	3.99	1.5
X 03/30/02	287.72	19.60	68.11	11.95	4.2
X 04/06/02	625.32	41.57	66.48	25.36	4.1
X 04/13/02	667.24	72.64	108.86	44.31	6.6
X 04/20/02	883.51	59.97	67.87	36.58	4.1
X 04/27/02	1,167.99	91.06	77.96	55.55	4.8
X 05/04/02	948.12	58.17	61.36	35.49	3.7
X 05/11/02	761.70	45.85	60.20	27.96	3.7
X 05/18/02	834.86	44.38	53.16	27.08	3.2
X 05/25/02	316.36	17.96	56.78	10.95	3.5
X 07/06/02	120.19	6.49	54.04	3.96	3.3
X 07/13/02	76.84	5.23	68.06	3.19	4.2
X 10/05/02	14.40	0.21	14.45	0.13	0.9
X 10/12/02	234.77	6.25	26.61	3.81	1.6
X 10/19/02	15.00	0.85	56.42	0.52	3.5
Z 04/27/02	1.88	0.08	42.52	0.05	2.7

TABLE 3

2002 Halibut Bycatch by target fishery and week
in the Gulf of Alaska

Hook & Line Gear

KEY	Groundfish Metric Tons	Halibut Bycatch Metric Tons	Rate (kg/mt)	Halibut Mortality Metric Tons	%
C 01/05/02	658.65	134.65	204.43	18.85	2.9
C 01/12/02	737.59	97.95	132.80	13.73	1.9
C 01/19/02	689.26	53.59	77.75	7.49	1.1
C 01/26/02	856.76	81.80	95.47	11.44	1.3
C 02/02/02	1,342.04	108.34	80.73	15.16	1.1
C 02/09/02	1,835.87	139.12	75.78	19.49	1.1
C 02/16/02	858.95	37.92	44.14	5.30	0.6
C 02/23/02	1,323.16	71.33	53.91	9.99	0.8
C 03/02/02	852.88	44.25	51.88	6.20	0.7
C 03/09/02	930.96	77.58	83.33	10.85	1.2
C 03/16/02	749.30	171.58	228.99	24.02	3.2
C 03/23/02	854.75	199.71	233.65	27.95	3.3
C 03/30/02	189.68	34.40	181.38	4.82	2.5
C 04/06/02	3.87	0.44	113.91	0.06	1.6
C 04/13/02	17.55	1.56	88.90	0.22	1.3
C 04/20/02	0.44	0.07	148.11	0.01	2.3
C 04/27/02	9.83	1.21	123.49	0.17	1.7
C 05/04/02	39.30	18.10	460.45	2.54	6.5
C 05/11/02	0.58	0.07	120.14	0.01	1.7
C 05/14/02	5.65	0.47	82.96	0.07	1.2
C 05/18/02	1.64	0.24	147.59	0.02	1.2
C 05/25/02	2.83	0.50	178.00	0.06	2.1
C 06/01/02	3.50	0.53	150.78	0.06	1.7
C 06/08/02	2.53	0.30	116.94	0.05	2.0
C 06/15/02	3.35	0.40	119.61	0.04	1.2
C 06/22/02	3.04	0.32	104.47	0.04	1.3
C 06/29/02	3.40	0.57	166.27	0.08	2.4
C 07/06/02	1.85	0.29	156.00	0.03	1.6
C 07/13/02	1.48	0.25	167.71	0.03	2.0

C 07/20/02	1.31	0.23	174.78	0.03	2.3
C 07/27/02	3.20	0.37	116.65	0.04	1.3
C 08/03/02	3.24	0.56	174.18	0.08	2.5
C 08/10/02	0.93	0.14	155.14	0.02	2.2
C 08/17/02	0.83	0.16	197.65	0.02	2.4
C 08/24/02	1.90	0.16	84.99	0.02	1.1
C 08/31/02	0.49	0.07	151.82	0.00	0.0
C 09/07/02	430.58	32.93	76.48	4.61	1.1
C 09/14/02	349.14	26.22	75.09	3.66	1.0
C 09/21/02	450.64	34.56	76.69	4.82	1.1
C 09/28/02	278.50	20.81	74.74	2.91	1.0
C 10/05/02	288.72	57.46	199.01	8.04	2.8
C 10/12/02	217.29	55.94	257.45	7.82	3.6
C 10/19/02	213.40	54.22	254.10	7.59	3.6
C 10/26/02	172.25	14.04	81.49	1.95	1.1
C 11/02/02	223.65	18.24	81.55	2.55	1.1
C 11/09/02	191.56	15.66	81.76	2.19	1.1
D 05/04/02	2.91	0.00	0.00	0.00	0.0
H 04/27/02	3.18	0.00	0.00	0.00	0.0
K 01/05/02	40.72	33.39	820.07	0.00	0.0
K 01/12/02	3.59	2.94	820.07	0.00	0.0
K 01/19/02	19.80	12.79	646.12	0.00	0.0
K 01/26/02	13.44	9.50	707.19	0.00	0.0
K 02/02/02	5.10	1.29	252.45	0.01	0.2
K 02/09/02	2.50	0.00	0.00	0.00	0.0
K 02/16/02	6.96	0.00	0.00	0.00	0.0
K 02/23/02	1.71	0.00	0.00	0.00	0.0
K 03/09/02	0.55	0.00	0.00	0.00	0.0
K 03/16/02	0.02	0.00	0.00	0.00	0.0
K 03/23/02	7.53	4.26	565.23	0.20	2.7
K 03/30/02	8.48	3.05	359.75	0.13	1.5
K 04/06/02	5.08	0.55	108.16	0.00	0.0
K 04/13/02	11.34	4.35	384.00	0.00	0.0
K 04/20/02	8.36	4.69	561.10	0.00	0.0
K 04/27/02	5.59	0.65	115.90	0.02	0.4
K 05/04/02	7.39	4.38	592.58	0.06	0.8
K 05/11/02	7.03	3.03	430.45	0.06	0.9
K 05/18/02	6.97	3.97	569.46	0.20	2.9
K 05/19/02	0.03	0.00	0.00	0.00	0.0
K 05/25/02	12.12	3.56	293.66	0.06	0.5
K 06/01/02	7.68	4.52	588.36	0.09	1.2
K 06/08/02	12.64	4.21	332.83	0.17	1.3
K 06/15/02	5.41	3.60	665.45	0.11	2.0
K 06/22/02	8.54	2.91	340.90	0.24	2.8
K 06/29/02	2.45	0.77	314.64	0.03	1.2
K 07/06/02	6.30	2.23	354.06	0.07	1.1
K 07/13/02	22.77	2.05	90.04	0.05	0.2
K 07/16/02	0.39	0.00	0.00	0.00	0.0
K 07/20/02	1.60	0.52	328.03	0.01	0.6
K 07/27/02	4.94	2.37	479.76	0.01	0.2
K 08/03/02	16.00	10.09	630.43	0.66	4.1
K 08/10/02	16.00	7.36	459.75	0.39	2.4
K 08/17/02	5.18	1.34	258.05	0.06	1.2
K 08/24/02	4.73	2.58	546.14	0.03	0.6
K 08/31/02	3.06	2.13	696.79	0.14	4.6
K 09/07/02	9.70	6.90	711.85	0.03	0.3
K 09/14/02	5.10	2.94	577.26	0.20	3.9
K 09/21/02	2.63	1.94	735.88	0.02	0.8
K 09/28/02	0.69	0.00	0.00	0.00	0.0
K 10/05/02	1.18	0.81	688.02	0.06	5.1
K 10/12/02	0.44	0.25	559.14	0.01	2.3
K 10/19/02	1.46	1.07	730.21	0.00	0.0
K 10/26/02	1.91	0.87	455.12	0.07	3.7

K 11/02/02	1. 69	0. 66	388. 20	0. 01	0. 6
K 11/09/02	3. 43	2. 78	810. 50	0. 01	0. 3
0 03/23/02	4. 88	3. 33	681. 39	0. 47	9. 6
0 03/30/02	0. 13	0. 00	0. 00	0. 00	0. 0
0 04/06/02	0. 12	0. 00	0. 00	0. 00	0. 0
0 04/13/02	0. 86	0. 00	0. 00	0. 00	0. 0
0 04/27/02	0. 05	0. 04	721. 40	0. 01	20. 0
0 05/04/02	0. 02	0. 01	721. 50	0. 00	0. 0
0 05/18/02	0. 69	0. 50	721. 30	0. 07	10. 1
0 05/25/02	0. 40	0. 29	721. 30	0. 04	10. 0
0 07/13/02	0. 01	0. 00	0. 00	0. 00	0. 0
0 07/20/02	0. 42	0. 00	0. 00	0. 00	0. 0
0 08/03/02	0. 90	0. 52	577. 04	0. 07	7. 8
0 08/17/02	0. 57	0. 41	721. 30	0. 05	8. 8
0 09/14/02	0. 10	0. 00	0. 00	0. 00	0. 0
0 09/21/02	0. 57	0. 41	721. 30	0. 06	10. 5
0 10/12/02	0. 15	0. 11	721. 33	0. 02	13. 3
0 10/26/02	0. 06	0. 04	721. 33	0. 01	16. 7
S 05/25/02	0. 71	0. 00	0. 00	0. 00	0. 0
S 10/05/02	0. 02	0. 00	0. 00	0. 00	0. 0
W 09/28/02	0. 10	0. 03	274. 20	0. 00	0. 0

TABLE 4

2002 Halibut Bycatch by target fishery and week
in the Gulf of Alaska

Pot Gear

KEY	Groundfish Metric Tons	Halibut Bycatch Metric Tons	Rate (kg/mt)	Halibut Mortality Metric Tons	%
C 01/05/02	82. 92	0. 50	6. 07	0. 02	0. 0
C 01/12/02	196. 27	1. 09	5. 56	0. 05	0. 0
C 01/19/02	213. 02	1. 23	5. 77	0. 07	0. 0
C 01/26/02	159. 63	0. 95	5. 96	0. 04	0. 0
C 02/02/02	538. 87	3. 21	5. 96	0. 18	0. 0
C 02/09/02	767. 14	5. 61	7. 31	0. 33	0. 0
C 02/16/02	459. 20	3. 37	7. 34	0. 21	0. 0
C 02/23/02	1, 070. 10	4. 56	4. 26	0. 27	0. 0
C 03/02/02	926. 82	1. 71	1. 85	0. 07	0. 0
C 03/09/02	538. 46	2. 59	4. 81	0. 16	0. 0
C 03/23/02	2. 96	0. 01	3. 87	0. 00	0. 0
C 03/30/02	20. 78	0. 02	1. 18	0. 00	0. 0
C 04/06/02	27. 76	0. 06	2. 11	0. 00	0. 0
C 09/07/02	58. 27	0. 25	4. 34	0. 02	0. 0
C 09/14/02	314. 53	3. 01	9. 57	0. 19	0. 1
C 09/21/02	426. 94	2. 88	6. 75	0. 16	0. 0
C 09/28/02	339. 68	1. 38	4. 05	0. 09	0. 0
C 10/05/02	368. 51	2. 37	6. 43	0. 14	0. 0
C 10/12/02	170. 92	1. 31	7. 66	0. 08	0. 0
C 10/26/02	9. 52	0. 05	5. 61	0. 00	0. 0
C 11/02/02	414. 78	1. 81	4. 36	0. 11	0. 0
C 11/09/02	101. 08	0. 44	4. 36	0. 02	0. 0
H 03/16/02	0. 16	0. 00	0. 00	0. 00	0. 0
H 04/27/02	0. 03	0. 00	0. 00	0. 00	0. 0
0 02/02/02	0. 77	0. 00	0. 00	0. 00	0. 0

0 02/16/02	1.38	0.00	0.00	0.00	0.0
0 02/23/02	0.52	0.00	0.00	0.00	0.0
0 03/09/02	0.71	0.00	0.00	0.00	0.0
0 03/16/02	1.25	0.00	0.00	0.00	0.0
0 03/23/02	1.58	0.00	0.00	0.00	0.0
0 03/30/02	3.56	0.00	0.00	0.00	0.0
0 04/06/02	4.76	0.00	0.00	0.00	0.0
0 04/13/02	2.89	0.00	0.00	0.00	0.0
0 04/20/02	1.24	0.00	0.00	0.00	0.0
0 04/27/02	1.20	0.00	0.00	0.00	0.0
0 05/04/02	1.66	0.00	0.00	0.00	0.0
0 05/11/02	0.05	0.00	0.00	0.00	0.0
0 09/28/02	0.25	0.00	0.00	0.00	0.0
0 10/05/02	0.47	0.00	0.00	0.00	0.0
0 10/12/02	0.39	0.00	0.00	0.00	0.0
0 10/26/02	1.58	0.00	0.00	0.00	0.0
0 11/02/02	0.68	0.00	0.00	0.00	0.0
0 11/09/02	1.18	0.00	0.00	0.00	0.0
P 03/23/02	0.05	0.00	0.00	0.00	0.0
S 07/06/02	0.65	0.00	0.00	0.00	0.0
S 07/27/02	21.96	0.00	0.00	0.00	0.0